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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,022	01/28/2002	Koji Uchimura	Q68273	2604
23373	7590	03/23/2006	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			SIEFKE, SAMUEL P	
			ART UNIT	PAPER NUMBER
			1743	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

5

<b>Office Action Summary</b>	<b>Application No.</b> 10/056,022	<b>Applicant(s)</b> UCHIMURA, KOJI	
	<b>Examiner</b> Samuel P. Siefke	<b>Art Unit</b> 1743	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4 and 5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/12/06</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

Claim 1 is objected to because of the following informalities: The Examiner suggests Claim 1 line 10 read, "wherein the light passing through the sample transmits the inner tube and then reflects at the air layer having a refraction index that is less than that of the inner tube, and the reflected light transmits the inner tube and enters the sample so as to pass in the sample liquid in the inner tube."

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

Art Unit: 1743

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Che et al. (USPN 5,604,587) in view of Reick et al. (USPN 3,641,332).

Che discloses a waveguide that is in the form of a capillary having a reflective surface defined by a material having a refractive index of less than 1.33. Excitation light is transmitted axially into the liquid at an end of the waveguide. The excitation light is transmitted the length of the waveguide, by reflection from the reflective surface, causing the fluid to emit Raman spectra. The waveguide 10 is constituted by a suitably shaped vessel 12, for example a capillary, for containing a liquid core 14, i.e., an aqueous sample. Capillary 12 may be fabricated from glass, quartz, transparent polymers such as polymethyl methacrylate (PMMA), polyvinylidene fluoride (PVDF) and ethylene tetrafluoroethylene (ETFE), or similar materials. Commercially available fluorocarbon material having a refractive index which is suitable for use in the practice of the present invention is sold by the Dupont Company under the trademark "Teflon AF". An arrangement wherein reflection of excitation light occurs at the exterior surface 18 of capillary 12 also allows the interior surface 16 of the capillary to be modified to reduce the adhesion or retention of molecules in the liquid due to surface potential. Referring to FIG. 1, the waveguide/cell 10 of a Raman spectrometer comprises a length of tubing defining a capillary 12 which may be wound (flexible) around a cylindrical form 20 for convenience. As shown in FIG. 2, the waveguide 10 is comprised of a long capillary 12 clad with a polymer material 38 having a refractive index lower than that of the sample liquid. The capillary wall and the sample liquid 14 together constitute the

Art Unit: 1743

core. The cladding 38 should have a thickness of at least four (4) times the wavelength of the light to be propagated by the waveguide, i.e., a cladding thickness of 2  $\mu\text{m}$  to 3.6  $\mu\text{m}$  is appropriate, and may be applied by dipping, spraying or other means known in the art. The cladding 38 protects the capillary from degradation due to light, moisture, oxidation and environmental contaminants. Such degradation typically causes the capillary to become brittle. Therefore, a Raman cell manufactured in accordance with the present invention is more flexible than conventional Raman cells. For example a Raman cell manufactured in accordance with the present invention may be wound into a three inch coil since capillary 12 supports the disclosed circular cross-sectional shape of the cell, the physical strength requirement for the cladding material is reduced. A protective outer coating or jacket 42 of stainless steel or other suitable material may be employed to protect the cladding material from scratching and mechanical abrasion.

He does not teach an air layer.

Reick teaches a fiber optic illumination system that comprises a flexible core of resinous material (Teflon) of large diameter contained within a flexible cladding tube (protective) and separated therefrom by an air layer having a relatively low refractive index compared to that of the core (abstract; col. 4, lines 48-52). The cladding tube (outside) is made of the lowest refractive index in order to protect the surface from scratches, dust, grease, all of which give rise to losses. Reick's main objective is that a light pipe constituted by a flexible core C enclosed in a flexible cladding tube T but separated therefrom by a film of air A, so that the protective properties of the cladding tube are combined with the optical effects of air. Reflection occurs at the interface of

Art Unit: 1743

the core C and air film A, the cladding serves to strengthen the tube and to protect the core (col. 5, lines 48-75). Therefore, it would have been obvious to one having an ordinary skill in the art to employ the air layer of Reick so that the protective properties of a cladding tube are combined with the optical effects of air which has the lowest possible refractive index, which maximizes the total reflection at the surface of the inner tube and the air layer.

### ***Response to Arguments***

Applicant's arguments filed 1/3/06 have been fully considered but they are not persuasive. Applicant argues, "Che discloses a core formed by resin inner tube and sample liquid flowing in the inner tube. Reick discloses a clad formed of an air layer. However, a skilled artisan would not have been motivated to combine Che and Reick. The Applicants respectfully submit that such a combination is difficult to achieve. Additionally, Reick merely shows an optical fiber, but not an analyzing cell. Further, because Reick uses a solid core, the sample liquid cannot flow therein. Thus Reick does not suggest flowing sample liquid in the optical fiber." Reick is used as prior art to show that an air layer within an optical tubing has the lowest possible refractive index, which maximizes the total reflection at the surface of the inner tube and the air layer. Che teaches that polymer material (cladding 38) must have a refractive index that is lower than that of the sample liquid. Air has the lowest possible refractive index and is employed in Reick because of this property. Therefore since Che requires the reflective

Art Unit: 1743

cladding polymer material have a refractive index that is lower than that of the sample liquid, the Examiner has provided the motivation for modifying Che to employ the air layer of Reick as the reflective layer.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel P. Siefke whose telephone number is 571-272-1262. The examiner can normally be reached on M-F 7:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on 571-272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Art Unit: 1743

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam P. Siefke



March 17, 2006



Jill Warden  
Supervisory Patent Examiner  
Technology Center 1700